



NAVY DEPARTMENT

## BUMED NEWS LETTER

a digest of timely information

Editor - Captain F. W. Farrar. (MC). U.S.N.

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Factorial Design: Because of the general and specific interests of Medical Department personnel in the understanding and application of scientific methods for the planning and interpretations incident to research studies, the notes on this subject are reproduced here essentially as they appear in the February 1945 issue of "Statistics of Navy Medicine" which has a less wide distribution.

In designing experiments, undue emphasis is commonly placed upon the importance of testing factors only one at a time and holding all other conditions constant. It is not infrequently believed that this is the only way satisfactory results can be obtained. It is uneconomical to use a testing procedure involving only one factor at a time on occasions when multiple factors could as well be tested at the same time.

The statistician has devised a technic described as the Factorial Design in Fisher's book, "The Design of Experiment." This technic allows many factors to vary simultaneously and makes it possible to study the effects of the several factors in one single experiment. It also makes possible the study of inter-relations among the several factors

The following is an illustration of the application of the principle of factorial design: Suppose it is desired to study the effects of four different ingredients of a medicinal prescription. Designate these ingredients as A, B, C and D. Now make up sixteen different mixtures containing all of the possible combinations of the absence or presence of each of the above component ingredients. Thus, for example, one mixture will contain ABCD, another mixture will contain BCD and a third may contain A\_C\_. One mixture will not contain any of the ingredients. Of the sixteen mixtures eight will contain ingredient A and eight will not. This is true for all the other ingredients, B, C and D.

Now suppose that each mixture is given to six patients, or fed to or applied to the skin of six animals. The total number of persons or animals involved in the experiment is, thus, 96. In respect to any one particular ingredient, there will exist a comparison between a set of 48 cases where the ingredient is present and a balanced set of 48 cases where the ingredient is absent. Thus, there is made possible in this factorial design four comparisons which ordinarily would require four times as many cases by the usual "holding constant" technic.

In a medicinal mixture it is not only important to know the effect of each component ingredient by itself but also the differential effect of each ingredient in the presence or absence of each other ingredient. To the statistician, this is known as studying interaction. Through the use of the technic for analysis



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of variance, it is possible when the experiment is factorially arranged to study and to evaluate all the possible interactions.

Thus, by use of the factorial design for research experiments when applicable, a large saving can be made and additional information can be derived from the experiment through the study of interaction. (Statistics of Navy Med., Feb. '46)

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Some Aspects of the Problem of Cancer: Unjustified pessimism exists among patients regarding the successful treatment of malignant disease. Many delay seeking medical help for fear that they have cancer.

The challenge presented by the problems incident to cancer is being met by research and the development therefrom of better methods of treatment.

The pathologist has become more skilled in the diagnosis of cancer and the grading of its rate of growth and stage of spread.

The surgeon through improvement in technic has successfully developed more radical operative procedures.

The radiologist with the aid of the physicist has greatly improved and extended irradiation technic.

The main strength of cancer is its insidious onset. This characteristic tends to prevent early successful treatment. Time is lost before the patient consults a physician and before the patient experiences the application of therapeutic measures.

Nothing can be done about the insidious onset of cancer. However, the delay of the patient in reporting to his physician can and is being corrected by the educational work that has emanated from the American Cancer Society. Such delay as may exist on the part of the physician in suspecting the presence of and recognizing early cancer can be and is being reduced through the greater use educationally of the opportunities offered by the cancer clinics. Many of these clinics are affiliated with medical schools where medical students and interested medical graduates have the opportunity to attend these clinics to observe early and late stages of cancer, and to hear the conferences held by the various specialists regarding differential diagnosis and treatment.

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The greatest weakness of cancer is its local origin. Diagnosis and destruction or surgical removal of the local area of origin of the cancer cells before spread is the ideal to be accomplished. Because cancer cells generally are more sensitive to irradiation than normal cells, irradiation procedures are more selective than surgical procedures where exact delineation of the extent of the cancer cannot be determined and where surgery cannot extend as far as good judgment would dictate because of intervening vital structures. The methods of surgery and irradiation are complementary and supplementary.

Many organizations have aided in the control of cancer.

The American Society for the Control of Cancer, Incorporated, was organized in 1913 by a group of eminent physicians interested in cancer therapy. It is now known as the American Cancer Society, Incorporated. Since 1913, educational material for patients and other laymen has been published and circulated. Since 1930, this has been accomplished mainly by the Women's Field Army of the American Cancer Society, now composed of more than 350,000 women. Scientific information regarding cancer is disseminated to the public by means of pamphlets, books, motion pictures, exhibits, radio programs and education in the schools. In 1930, this society cooperated with the American College of Surgeons in setting standards for cancer clinics for general hospitals. More than 375 of these clinics are now in operation in the United States. These cancer clinics were an essential development in the treatment of cancer. The complex problem of cancer can be solved only by the proper correlation of the different specialties in deciding upon the proper treatment or combination of treatments for the individual patient.

In 1937, the Congress of the United States created The National Cancer Institute as part of the United States Public Health Service. A Cancer Advisory Council was created. Under the National Cancer Institute Act, 9.5 Gm. of radium was purchased by the government. This radium is lent to qualified radiologists for treatment of indigent patients and for research. Grants-in-aid for cancer research in the institute and elsewhere are approved or rejected by the Advisory Council.

There are many state centers of cancer research and treatment.

Cancer prevention clinics, aided by grants by the American Medical Association, the American Cancer Society and other organizations, have been started in Philadelphia, New York and Chicago in recent years. Complete semi-annual examinations have been given to all applicants between the ages of thirty and eighty who have requested them. Although they were aware of no symptom or sign of disease, among the first 1,000 women examined in Philadelphia,



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three had cancer of the uterine cervix and among the first 2,105 examinations of the breast, five cancers were discovered. All were cured by proper treatment. Similar results are reported from the New York and Chicago clinics.

Modern methods of treatment have yielded more satisfactory results than is generally realized. Recent statistics of 36,000 "cured" cases of cancer in which treatment consisted of surgical removal, irradiation or a combination of both have been collected by the American College of Surgeons. The patients concerned have all been free of evidence of cancer for at least five years following treatment. Although conscientiously well-planned treatment, which is often tedious, usually brings satisfactory results when opportunity allows reasonably early application, at times the most carefully planned management fails.

In a discussion of cancer therapy, cure or arrest of the disease is always emphasized, as it should be, but not enough consideration is given to the palliation that is or may be achieved. Even if the patient eventually dies of cancer, the elimination of pain, hemorrhage and foul discharges is well worth while.

Surgery and irradiation are achieving a success in cancer treatment not universally recognized. Until research yields more effective weapons to combat the various types of cancer, these procedures separately or in combination constitute the only measures which have proved curative. (Modern Treatment of Cancer - Fricke. Proc. Staff Meet. Mayo Clin., Jan. 9, '46)

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Survey for Gastric Carcinoma: The diagnosis of carcinoma of the stomach in most cases is made too late with respect to operability of the lesions; hence the rate of cure, considering all cases, is exceedingly low.

Alvarez has shown that physicians suffering from gastric cancer have not sought medical advice on the average more promptly than laymen and that the cancers when diagnosed in each group have been equally far advanced. Mortality rates, autopsy statistics and hospital census data do not give a full picture of the incidence of silent gastric cancer.

Because of these facts, the authors, working on the rationale underlying chest roentgenogram studies of population groups, attempted to discover minimal gastric carcinomas by barium meal X-ray studies of 500 normal men over 45 years of age who claimed to be free of digestive complaints. No gastric cancers were found.

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The authors point out that while their survey was in progress, St. John, Swenson and Harvey in studying similarly a series of 2,413 men and women not necessarily free from digestive complaints found three gastric cancers and five gastric ulcers.

Among 211 cases of pernicious anemia studied since 1939 roentgenologically every six months, Rigler has discovered seventeen gastric cancers and fifteen polyps.

Conclusions: 1. Based upon the results of this and other surveys, together with the difficulties encountered in individual follow-up examinations of suspected lesions, roentgenographic studies of the general population for silent gastric carcinomas are not practical.

2. Studies should be expanded on selected groups, such as (a) those above age 40 with varying degrees of digestive dysfunction and (b) those with pernicious anemia. (Gastroenterol., July '45 - Dailey and Miller)

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Studies with the Electron Microscope on the Mechanism of Fluorine Deposition in Teeth: Experience has shown that individuals who have been exposed to fluorides in domestic water during the critical period of tooth calcification and afterward have moved to an area with a fluoride-free water supply continue to have an increased resistance to dental caries. Conversely, individuals who have been exposed to a fluoride-free water supply during tooth developmental periods and later have moved to an area with a water supply containing fluorides in appreciable amounts show no increase in resistance to dental caries or macroscopic mottling although the fluoride may have been as high as 14 p.p.m. and the exposure of many years' duration.

Analytical data on enamel and dentin showed the fluorosed or macroscopically mottled teeth to contain from 3 to 5 times as much fluoride as normal teeth, and the fluorine content found is directly proportional to the caries resistance that has been shown. Since completely unerupted teeth from endemic areas often show macroscopic mottling, it appears probable that this fluorine arrives in the teeth systemically and not via local surface absorption.

Knutson and Armstrong reported that from 7 to 15 topical applications of 2 per cent solution of sodium fluoride to children's teeth over a period of one year caused a decrease in caries incidence of 40 per cent. During such topical applications no visible indications of dental fluorosis were reported, although fluorine is incorporated into the enamel at least on the surface, and this takes place without appreciable fluoride ingestion.



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Believing a difference to exist between the action of fluorine administered systemically and that applied topically, the author used chemical analysis, X-ray diffraction, electron diffraction and electron microscopy in an attempt to show that different mechanisms of fluorine deposition really exist, and to learn as much as possible about those mechanisms.

No significant differences were seen between the cleavage patterns of normal and fluorosed teeth.

The external enamel surfaces of fluorosed teeth (without etching) showed a tendency toward greater microscopic roughness than that of the normal teeth.

Comparisons between the polished and etched dentin of normal teeth and that of fluorosed teeth showed a difference which seems to be of significance in this study. When fluorosed enamel or dentin is etched with hydrochloric acid, a new fine type of background structure appears, indicating an exceedingly fine dispersion throughout the hydroxy and carbonate apatites of a new mineral phase more resistant to the hydrochloric acid etching than the hydroxy and carbonate apatites normally found in teeth. It is considered probable that this fine dispersion represents calcium fluorapatite. Analysis by electron diffraction using the reflection method showed a strong pattern of apatite without the slightest trace of calcium fluoride lines.

In the case of topical applications, the data indicate that the fluorine enters the dental tissue not by means of the physical process of adsorption but by the chemical process of double decomposition reaction between the apatite and the soluble fluoride and is laid down as insoluble calcium fluoride.

In the past it has appeared difficult to correlate the mechanism of caries reduction in the case of fluorides available systemically with that occurring incident to the topical applications of fluorides. No single hypothesis seems to fit both cases. However, there are two significant factors common to both, namely, (1) fluorine is incorporated into tooth structure in both cases, and (2) the two fluoride compounds formed thereby are both more acid-resistant than the normal apatite structures of teeth. On this basis the author postulates that a possible general mechanism explaining the fluorine-caries relationship might be as follows:

1. The oral Lactobacillus acidophilus or other acidogens form acids which attack the tooth surface preferentially, dissolving the more soluble apatites and leaving the less soluble fluoride compounds concentrated on the surface.

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2. This dissolution of the tooth surface by the acid-forming bacteria produces a solution containing progressively higher concentrations of fluoride ions at the point of attack and underneath any bacterial plaques present. The result is a high concentration of fluoride ions at the point of attack even though the fluoride concentration in the saliva may remain so low as to be considered negligible.

3. This progressive concentration of fluoride ions will continue until the concentration is such that inhibition of bacterial growth and acid production results. Conditions of equilibrium which are not conducive to active dental caries are thus established.

The author states that his paper is based upon limited data and that the work is preliminary in nature. (J. Dental Research, Oct. '45 - Gerould)

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Some Aspects of the Epidemiology of Infectious Hepatitis: Because of its attained military importance, a renewed interest has been stimulated in infectious hepatitis.

There appears little evidence to indicate that infectious hepatitis differs significantly from the disease occurring in outbreaks described as epidemic jaundice in the United States, as infective hepatitis in England, and as hepatitis epidemica in Scandinavia, Germany and many other parts of the world. There are no ready means of differentiating infectious hepatitis from catarrhal jaundice. It is not clear whether post-vaccinal hepatitis, transfusion jaundice and homologous serum jaundice may not all be examples of the artificial propagation of the same disease.

A wide geographic distribution is indicated in reports on 19th century outbreaks. Infectious hepatitis probably occurs throughout the world but, because of no specific diagnostic test for it, the exact distribution is not known. In the United States and many other countries it is commonly seen in the civilian population as a disease of childhood with most cases in the age range of from 5 to 17 years, but it is not uncommon in young adults as shown by military and university epidemics. In certain parts of the world there appears a distinct seasonal trend, with an increase in prevalence beginning in the fall and usually building up to epidemic proportions in the late fall and early winter, but sometimes extending through winter and into spring.



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Inasmuch as the childhood form is usually very mild and easily overlooked, it is suggested that most adults have been exposed in early life and have even had the disease in unrecognized form and so have acquired a certain degree of immunity. Outbreaks involving several hundred people (usually children) over a period of from one to two months are common in civilian populations. Institutional and family outbreaks are traditional. Many cases occurred in troops during World War I and II in the eastern half of the Mediterranean area. Some military units have shown case rates as high as 40 or 50 per cent of the command. Such severe epidemics occur under poor conditions and often where dysentery has been or is rife. Predisposing causes are probably important. They may be poor diet, alcohol, poor living conditions, and exposure during active campaigns.

The incubation period is estimated in most epidemics to be between 20 and 40 days, averaging from 26 to 28 days. In experimental human cases induced by feeding serum or feces, the average incubation period has been 25 days. Occasionally it has been as short as 16 or prolonged to 85 days.

There is good reason to suspect the intestinal oral circuit as one of the natural routes of spread. This is based upon work indicating the presence of the virus in feces during the acute phase of the disease, and the fact that infectious hepatitis can be transmitted to human volunteers by feeding them infected feces. The ease with which the virus lends itself to cause these infections experimentally gives weight to the hypothesis that the oral intestinal circuit is a probable mechanism in natural spread. The limits of the intestinal carrier state are not accurately determined. Studies by Kirk of infectious hepatitis in New Zealand soldiers at El Alamein in 1942 led him to believe that the disease is spread by flies carrying infection from human excreta. Neefe and Stokes recently reported the transmission of hepatitis without jaundice to human volunteers by oral administration of water from a well at a children's camp where a large outbreak of infectious hepatitis had occurred.

Until disproved, the possible transmission by biting insects deserves consideration.

The artificial transmission by improperly sterilized syringes in a diabetic clinic has been reported by Droller.

The extreme viability of the icterogenic agent and the infectiousness of small quantities of serum (0.01 milliliter) point to the fact that the disease is probably transmitted artificially more often than is realized.

The agent or virus, while not actually isolated, is present in blood and feces of patients in the pre-icteric and early icteric phases of the disease.

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It may also be present in the urine at this time. It withstands heating at 56° C. for at least one-half hour. It has been passed through filters which exclude bacteria and hence has been called a virus. Attempts to infect common laboratory animals have failed. Unconfirmed reports by German workers state that they have cultivated the virus in the developing chick embryo, and also have transmitted it to birds.

The natural history of the disease supports the concept of a widespread immunity in the general population incited by clinical or subclinical infection. The protective effect of human gamma globulin against infectious hepatitis was suggested by the work of Stokes and Neefe. Preliminary experiments with human volunteers indicate that an attack of infectious hepatitis provides immunity against reinfection with a similar strain. The question whether or not there is immunity against multiple strains deserves much more study. The etiological agent of homologous serum jaundice has not yet been demonstrated in the stool and successful transmission experiments by the oral route are limited. Patients convalescent six months from homologous serum jaundice contracted infectious hepatitis when inoculated with a strain of infectious hepatitis virus. (Am. J. Pub. Health, Jan. '46 - Havens)

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Infectious Hepatitis - Report on Milk-Borne Outbreak: A small outbreak of ten cases of infectious hepatitis which occurred in Forsythe, Georgia, during the period from May 21 to June 28, 1945, was studied by Murphy, Petrie and Work. They concluded that the accumulated evidence, although purely circumstantial in character, pointed quite definitely to a single milk supply as the source of the infection. The dairy believed incriminated supplied raw milk to 26 households with 114 consumers among whom the cases developed. The population segment not using this source of milk supply and in which the disease did not occur was twenty times the size of the affected segment. The sequence of events, besides the distribution of the cases, followed the general pattern of milk-borne outbreaks of other diseases. (Am. J. Pub. Health, Feb. '46)

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Information on Field Tests with 1080: Cox of the Texas State Board of Health reports the recovery of 5751 dead rats, 19 sick rats, and 671 dead mice from the use of 6 pounds of sodium fluoroacetate (1080) made into baits and placed in and around 593 premises.



In the tests conducted several solid baits were used. The greatest successes, however, were obtained by using water preparations containing 1080 (0.25 to 1.5 oz. per gal.). In most instances dead rodents were recovered within several feet or adjacent to the bait. The viscera of rats killed by 1080 when used as bait were lethal to other rodents and cats. Other parts of 1080-poisoned rats were not particularly toxic to cats.

Numerous cats and dogs, one snake, and 3 hogs were reported killed. The evidence indicated that the animals died from eating poisoned rats. Several dead rabbits found were believed to have eaten the 1080 torpedoes.

There were no reports of the accidental poisoning of human beings.

It was indicated that 1080 had other potential uses, namely, in the control of red ants, cockroaches, crickets, ground squirrels and prairie dogs. For the insects named, it was reported that doughnuts, all-bran, graham and vanilla wafers when well mixed with dilute 1080 solution would probably make desirable bait preparations. Destruction of the characteristic shape and appearance of the doughnuts and wafers is essential as a precautionary measure. (N.R.C. Abstract Bulletin #28, Series A, of the Insect Control Committee Coordination Center)

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Summary of Results Obtained in Tests of 1080 in Texas: A survey of field tests using 1080 in water preparations of 0.25 - 0.5 oz. of 1080 per gal. was made. These tests indicated that rats will readily accept 1080-treated water despite availability of other water supplies, i.e., pools of rainwater, etc.

Some advantages of using 1080 were found to be the ease of preparing bait with it, its rapid action - which results in a larger recovery of killed rats and mice - and the simplicity and economy attendant upon field operations both in labor and cost.

Although special precautions were taken to prevent cats from having access to the poisoned waters, many were killed evidently as a result of eating the dead rats. In all operations only 5 dogs were killed, which was considerably less than in other projects where meat baits were used with thallium sulfate, barium carbonate, etc. No other livestock or pets were killed. No poultry was killed even though dead mice poisoned with 1080 were present in the poultry yards. In other projects using thallium sulfate, some poultry were killed when poisoned dead mice were available.

It was found that 1080 is useful in controlling ants and that it might also be used in control of flies, roaches and weevils. For house ants, 0.5 per cent

concentration in a simple sugar syrup has been found effective. For field ants, stale cake, saturated with 1/8 oz. 1080 per gallon dried and ground into a fine powder, has been found most effective. (N.R.C. Abstract Bulletin #28, Series A, of the Insect Control Committee Coordination Center)

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Effects of Certain Drugs on Prothrombin Blood Level and Test for Estimations: Quick, following recent studies on the effects of synthetic vitamin K and of quinine sulfate on the prothrombin level of the blood, states that:

1. With the introduction of the use of dicumarol therapeutically and with the finding that other drugs can cause a decrease in the prothrombin level of the blood, the necessity of a standardized test for determining prothrombin, with the results expressed as per cent of normal, has become urgent; the only test which meets these requirements is his own one-stage method. Because of the disturbance of the physicochemical equilibrium of plasma by high dilution and because prothrombin is not a single substance but a complex of two components and calcium, studies of prothrombin levels made on highly diluted plasma are not comparable with studies not so made.

2. Three acceptable synthetic compounds having high vitamin K activity when given in relatively large single doses did not cause perceptable hyperprothrombinemia in rabbits, dogs and man. Even if a state of hyperprothrombinemia can be produced by drugs, the coagulation time would not necessarily be affected.

3. Quinine sulfate, when given to well persons in daily doses of 0.33 grams caused no decrease in the prothrombin of their blood.

4. Instead of giving synthetic vitamin K prophylactically to all patients receiving large dosages of salicylates, it seems that the probably wiser course is to determine the level of prothrombin at frequent intervals and if the prothrombin falls to a dangerous level, treatment with a water soluble menadione derivative intravenously should be given immediately. (J. Lab. and Clin. Med., Jan. '46)

Note: The most recent description of Quick's test for prothrombin estimation is contained in the American Journal of Clinical Pathology for December 1945.

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Incidence of Certain Biological Characteristics Among Food Poisoning Staphylococci: The author points out that the final identification of a given staphylococcal strain as the causative agent of a food poisoning outbreak is usually dependent upon its ability to produce enterotoxin as measured by one of the cat tests.

Although Strittar and Jordan have demonstrated that no one staphylococcus is responsible for food poisoning, it was considered that the results obtained by a slightly differing combination of tests in a series of 109 staphylococcal strains isolated from food poisoning material might be of interest.

Results of this study confirm Strittar and Jordan's early findings that if enterotoxin production is used as the criterion of food poisoning capability, none of the other biological characteristics occur with sufficient regularity to be pathognomonic of such ability. However, the author's data do suggest the generalization that golden, coagulase positive, hemolytic staphylococci isolated from suspected food poisoning sources are likely to be enterotoxin producers. Consequently, a determination of these characteristics may be employed as a screening procedure in situations where animal testing must be conducted on a limited scale. Such screening must be undertaken only with the realization that a number of cat-positive specimens will be missed. The suggestion is made to seed all staphylococci isolated from a single food, or from all specimens, in one flask of enterotoxin medium and then to use the common filtrate in a small group of animals.

#### Sources of 27 Enterotoxin Positive Staphylococcal Strains

<u>Source</u>	<u>Golden</u>	<u>White</u>
Pudding	2	1
Cake	1	0
Rice	1	0
Vomit	7	0
Meat	1	0
Meat Sandwiches	0	2
Cocoa	1	0
Peas	1	0
Fish	2	0
Wieners	1	0
Unknown	6	0

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Summary and Conclusions: Of the 109 strains of staphylococci isolated from food and human vomitus during bacteriological studies of food poisoning outbreaks, 27 strains produced enterotoxin as measured by one of the cat tests. Twenty-three of the 27 were classified as Staphylococcus aureus, and 4 as Staphylococcus albus. Of the Staphylococcus aureus, 78 per cent were coagulase positive and 61 per cent were hemolytic, while 14 per cent fermented mannite. The Staphylococcus albus strains showed none of these characteristics.

Those staphylococcal strains which produced coagulase, hemolysin, and golden pigment were more likely to produce enterotoxin but this combination of characteristics does not occur with sufficient regularity to replace the cat tests. (Am. J. Pub. Health, Jan. '46 - Feldman)

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Measurement of Joint Motion: West points out that the importance of the measurement of joint motion for (a) diagnosis, (b) progress in treatment, (c) estimation of permanent disability and (d) as a record for future comparison is well recognized. Standardization of measurement requires that (1) the principles of motion be defined for all joints; (2) a simple, convenient, inexpensive and accessible measuring device for all motions of the joints be used; (3) landmarks of skeletal parts be defined and used consistently; (4) the normal range of motion of each joint be understood.

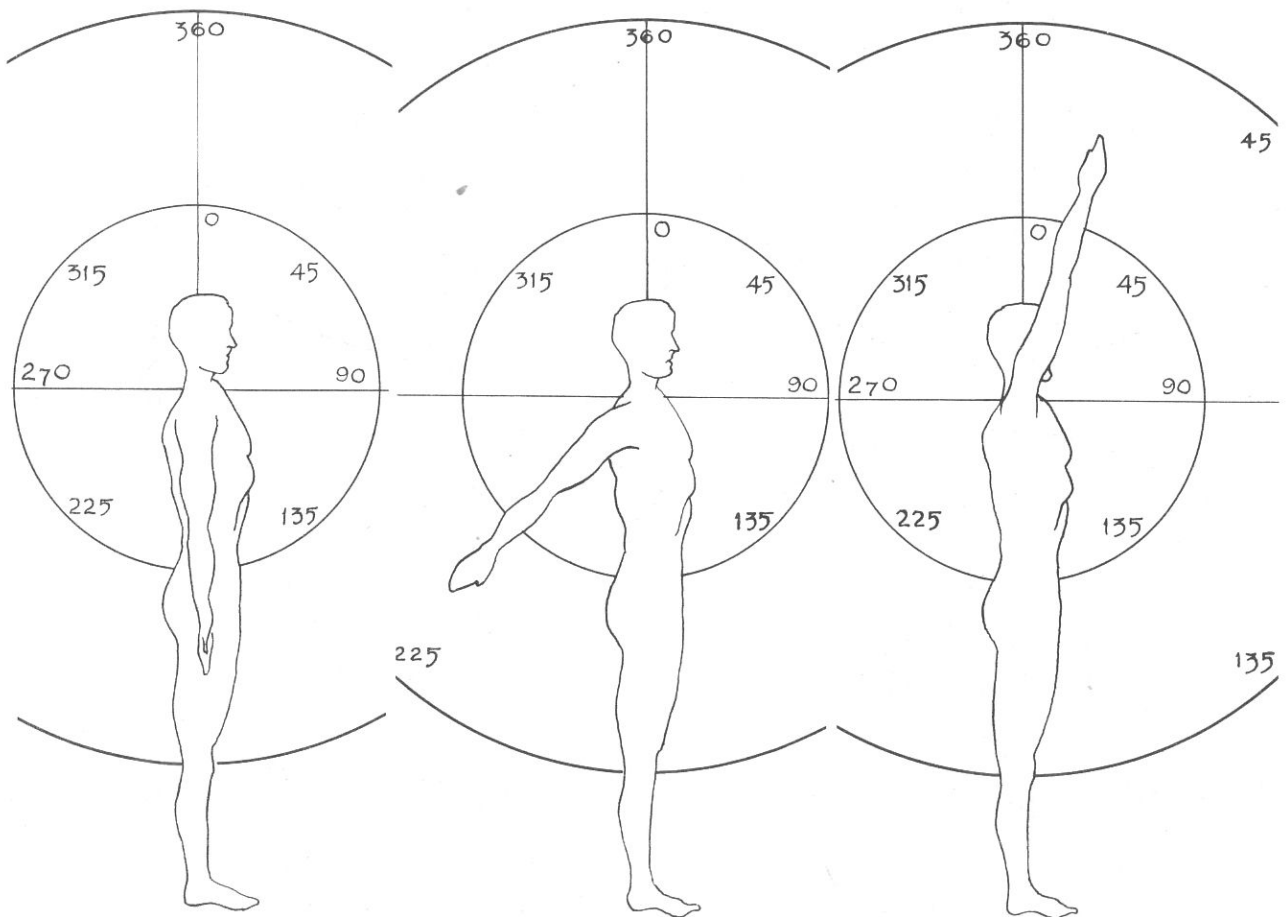
The author states that ten years ago Knapp set about to develop a method which would be simple enough so that clerical or technical help could make the measurements with a minimum of error, would be accurate within 5 degrees plus or minus on repeated measurements and would have as few variables as possible. These criteria of simplicity, accuracy and uniformity of technic are gradually being evolved.

During this ten-year period in the fracture clinic and in the physical therapy department of the Minneapolis General Hospital the measurement of joint motion has been performed by the clerk and the technical staff. During this period a series of measurements have been recorded also for uninvolved joints of patients treated for fractures.

Doctor West describes this system of measurement in its full application to all the motions of the shoulder, elbow, wrist, hip, knee, and ankle and discusses the normal range of motion of the shoulder, elbow and wrist. The basic motions of flexion and extension are described on a full circle of 360 degrees in a sagittal plane of the anatomic position. The anatomic position represents

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the human body as standing erect, the eyes looking forward to the horizon, the arms by the sides and the palms and toes directed forward. Flexion is the motion that approaches zero, and extension is the motion that approaches 360 degrees, the difference between the two being the range of motion in that plane. The goniometer that is used is an inexpensive carpenter's boxwood rule equipped with a level and small protractor reading in  $5^{\circ}$  intervals up to  $180^{\circ}$ . Only the illustrations of the basic position and positions for measuring extension and flexion of the shoulder, elbow and wrist are included here. (Arch. Phys. Med. - July '45)



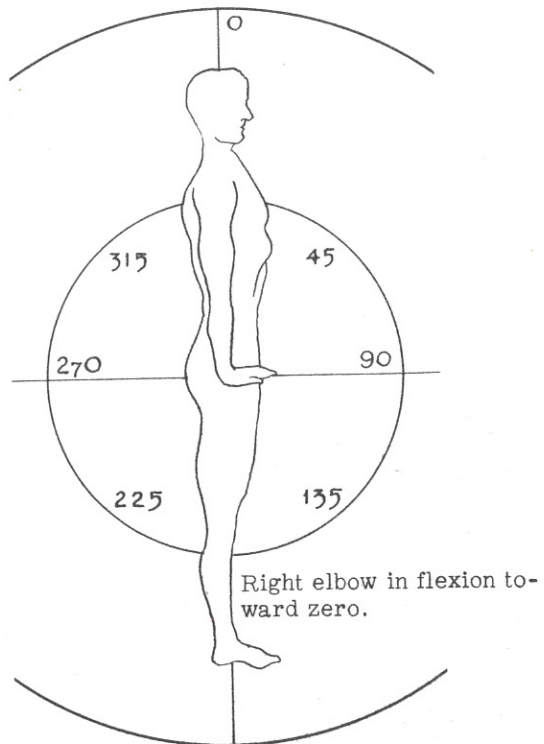
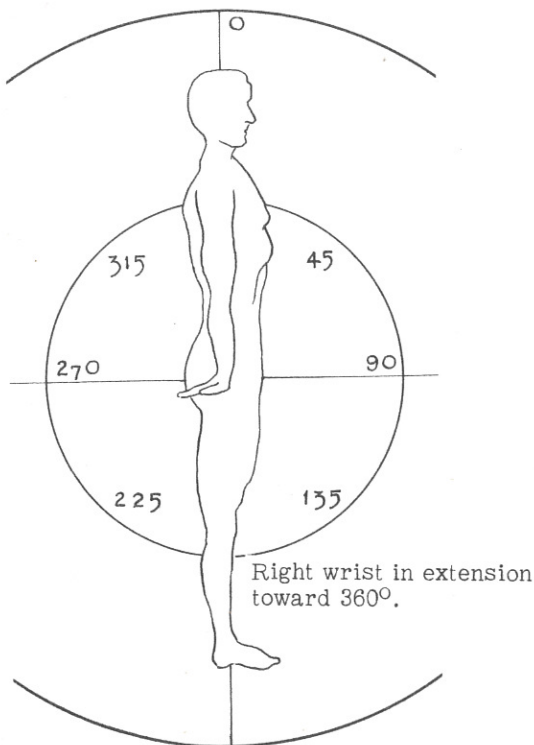
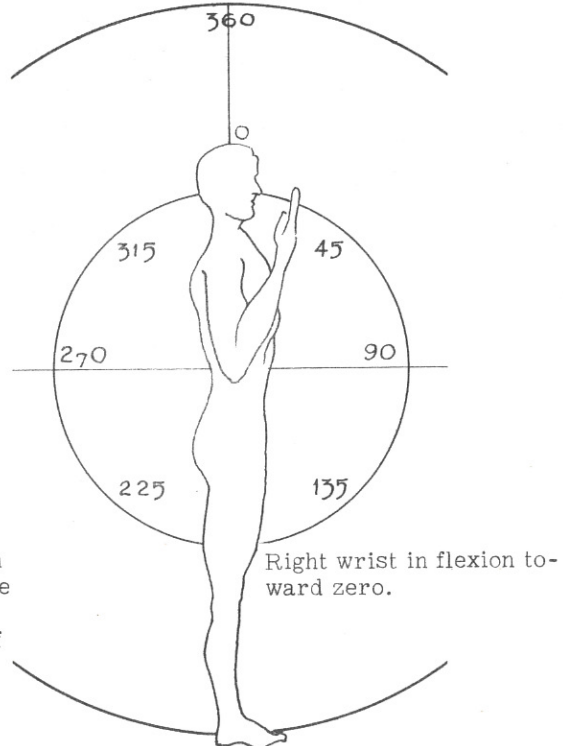
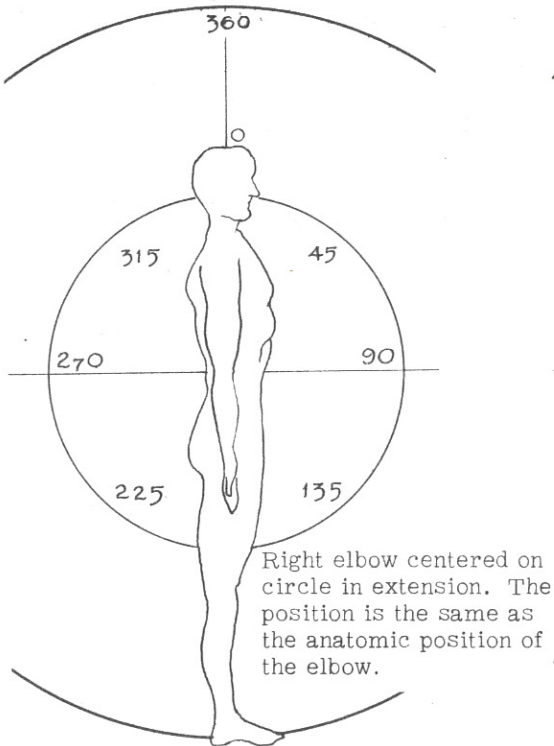
Subject standing in anatomic position (lateral view) with shoulder centered on circle.

Subject has moved shoulder (right) from anatomic position through its arc of extension backward toward  $360^{\circ}$ .

Right shoulder in flexion forward toward zero.



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Abstracts of Reports on Research Projects: (Full reports are available upon request.)

X-505      Stable Emulsion of Dimethyl Phthalate for Impregnation of Clothing.

Studies were made to evaluate four technics of applying DMP (Dimethyl Phthalate) as a repellent and miticide. The skin method, the smear method, the barrier method, and the impregnation method were tried by a group of subjects.

The data indicated the inferiority of the impregnation method as compared with other methods. A gross comparison of the other three methods evidenced no individual superiority. A statistical comparison suggested a slight superiority of the barrier method. (M. Field Research Lab., Camp Lejeune, N.C.)

X-205      Environmental and Physiologic Studies Aboard Two Air-Cooled Hospital Ships en route from Norfolk, Virginia, to the Canal Zone.

Within the cooled spaces of both ships the "effective" temperature was maintained at about 76° F.

Studies were made to determine the effects of air-cooled as compared with nonair-cooled conditions on men in transit from a temperate to a tropical zone. (N.M.R.I., National Naval Medical Center, Bethesda 14, Md.)

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Procurement of Streptomycin: By evaluating information received from various sources, BuMed is now in a position to define more accurately the indications for the use of streptomycin. The supply, however, remains limited. Requests for streptomycin should be directed to the Medical Supply Depot, Brooklyn, New York, as special requisitions by dispatch, speedletter or air-mail as indicated, stating the type of case for which streptomycin is needed, the pertinent bacteriological findings, and the amount desired. Care should be taken to request only the amount needed.

Until further notice, streptomycin will be issued as it becomes available for the treatment of the following conditions, which will receive priority in the order listed; the optimum dosage is indicated after each disease:

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Order of  
PriorityDisease Conditions with Optimum Dosage

1. Tularemia - from 0.5 to 1.0 gram intramuscularly per day for from 2 to 8 days.
2. Hemophilus influenzae meningitis - 1.0 gram per day intramuscularly plus 25,000 to 50,000 micrograms intrathecally daily.
3. E. coli meningitis - 2.4 grams per day intramuscularly plus from 25,000 to 50,000 micrograms intrathecally daily.
4. Urinary tract infections due to Gram-negative bacilli (excluding typhoid-paratyphoid bacilli) - from 2.4 to 3.2 grams intramuscularly per day.
5. Friedlander bacillus (Klebsiella pneumoniae) infections - 2.4 grams intramuscularly per day.
6. Tuberculous meningitis - from 1.6 to 2.4 grams per day intramuscularly plus 50,000 micrograms intrathecally daily or every second day.
7. Tissue infections (including empyema and osteomyelitis) in which the bacteriological studies indicate a sufficient growth of Gram-negative bacilli to be primarily responsible for non-healing - from 1.2 to 2.4 grams per day intramuscularly plus local instillation (1,000 micrograms per c.c. of solution) where indicated.

Note: Streptomycin is now officially designated in terms of the metric system and expressed as grams and micrograms. One microgram, namely, one-millionth of a gram, is the equivalent of the former S-unit.

In patients with meningitis the streptomycin may be dissolved either in freshly-drawn spinal fluid or in saline solution.

Many bacteria have demonstrated the ability to develop resistance to streptomycin with more rapidity and to a much greater extent than to penicillin. For this reason, larger dosages are being recommended than were listed in the previous announcement.



(Not Restricted)

To assist BuMed further in ascertaining the value of streptomycin in various infections, it is of the utmost importance that medical officers carefully fill in the streptomycin report form (NavMed-982) which will accompany each shipment of streptomycin for the next several weeks, and forward it to BuMed. (Chief, BuMed)

Note: This announcement supersedes the one which appeared in the Bumed News Letter, Volume 6, Number 7, of September 28, 1945.

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(Not Restricted)

Streptomycin - Production and Distribution Control: Roy S. Kock, of the Chemical Division of the Civilian Production Administration, has announced that grants-in-aid amounting to more than \$500,000 for clinical study of streptomycin have been contributed to the National Research Council in equal shares by eleven pharmaceutical manufacturers constituting the Streptomycin Producers Advisory Committee of the Civilian Production Administration.

The grants-in-aid are to finance a program for the clinical evaluation of streptomycin in infectious diseases by the Committee on Chemotherapeutics and Other Agents of the National Research Council. Chester S. Keefer, M.D., of Boston, who headed the clinical investigation of penicillin for the Office of Scientific Research and Development during the war, will have charge of the new program. Upon completion of this program Doctor Keefer will submit a report, "Streptomycin: The Indications, Contra-Indications, Mode of Administration and Dosage."

Streptomycin is a mold derivative similar in some respects to penicillin and is expected to prove a valuable supplement to that drug in that it promise to be effective against a number of infectious diseases which do not yield to penicillin. Studies on the use of streptomycin have not yet advanced to a point where either the methods of administration or the amenable diseases are definitely known.

Allocations of streptomycin under the newly issued Schedule 119 of Order M-300 became effective March 1, 1946. Approximately 63 per cent of the available supply is being allocated to the Army, Navy, U.S. Public Health Service, and the Veterans Administration. The remaining 37 per cent is being allocated for clinical research.

Representatives of the participating government agencies who attended a meeting of the Streptomycin Producers Advisory Committee on February 20

(Not Restricted)

reported their approval of the program and that they will entrust segments of their research on streptomycin to Doctor Keefer. CPA stated that civilian requests for streptomycin after March 1 must be made by physicians who should supply complete clinical data on their cases to Doctor Keefer at his headquarters in the Evans Memorial Hospital, Boston, Massachusetts.

It was stated that there will be no commercial distribution of streptomycin at this time, and CPA and the producers will not supply material directly for civilian appeals; further, that physicians should limit their appeals to Doctor Keefer for streptomycin to those for the treatment of patients with infections that are not susceptible to the action of the sulfonamides, penicillin, and other therapeutic agents.

The production of streptomycin has increased from approximately 3,000 grams last September, CPA said, to approximately 27,000 grams expected in March 1946. This is equivalent to 27,000 vials of one million micrograms each. Later this year the Chemical Division of CPA anticipates that the companies will be producing the drug at a greatly increased rate. Streptomycin is a fine powder in its finished state, and is produced by fermentation and chemical extraction like penicillin, requiring carefully controlled conditions of sterility, temperature and air.

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(Not Restricted)

Prevention of Disability Incident to the Placing of Ships in "Inactive Status" and on Other Occasions: Because of its wide interest to all medical officers and particularly to those with forces afloat, a letter directing attention to certain health hazards that might be expected in connection with ships being placed in "inactive status" is here reproduced:

Com16thFlt File  
P2-4(2)/(75)t

Care of Fleet Post Office,  
New York, New York

Serial: 340

30 January 1946

From: Commander Sixteenth Fleet.  
To: Group Commanders, Sixteenth Fleet.

Subject: Letter of Instruction (Medical) for All Group Commanders (No. 27),  
Health and Accident Hazards.

GENERAL: There exist many health and accident hazards in the performance of duty incident to the preservation of ships. Most of them have been

(Not Restricted)

defined, and the means of prevention outlined in the manuals and circular letters published by the responsible Bureaus and in the course of instruction at the Preservation School. As a part of their duty in preventive medicine, medical officers should be on the alert to detect health hazards and should make suitable recommendations for their correction. No pretense is made that the following list of hazards is complete, but it should serve to bring to mind others of equal importance.

THIN FILM PRESERVATIVES: (a) Grade #1, Thin Film Preservative, #52-C-18, in most commercial preparations has a high content of crude lead monoxide. An approved respirator should be worn by those applying it in closed spaces to prevent lead poisoning. (b) Grades #2 and #3 Thin Film Preservative have lanolin as the basic ingredient but the solvent is a hydrocarbon, usually "Stoddards'" solvent. Several cases of acute dermatitis resulting from its use have been reported by the Nineteenth Fleet. The solvent dissolves and extracts fat and cholesterol from the skin thus causing the dermatitis. Personnel with dry skin consequently should be excluded from such work details. Protective gloves resistant to the solvents such as those made of polyvinyl alcohol, trade name "Resistoflex"; "Pliofilm", manufactured by the Goodyear Tire and Rubber Company; "Koroseal", manufactured by the B. F. Goodrich Tire and Rubber Company; and "Vinylite", manufactured by the Union Carbide and Carbon Company are effective. Protective ointments such as "West Protective Cream" #23 or #33, manufactured by the West Disinfecting Company, Long Island, N.Y.; or "Ply" #2 manufactured by the Milburn Company, Detroit, Mich., may be used to good advantage. Neither the gloves nor the ointment are medical department material and must be obtained through the Group Supply Officer.

OS3602: The sealing compound used for ordnance material, OS3602, has either methyl-ethyl ketone or methyl-isobutyle ketone as its vehicle. These have a flash point of about 34° F. and when atomized during application create an explosive mixture capable of being ignited by any spark, even that created by a shoe nail on a metal deck; thus elaborate precautions must be taken as listed in BuOrd OP1485 of 2 April 1945. If rubber shoes are worn, the operators should be grounded electrically to avoid static sparks.

SEALED SPACES: There has been considerable discussion relating to the possibilities of the depletion of oxygen to a dangerous degree in spaces sealed for a prolonged period of time. Considerable evidence exists that this will not occur. In view of the fact that oxidation is a chemical process which is markedly retarded by the lack of moisture in dehumidified spaces and that it is virtually impossible to seal a ship gas-tight, the problem is considered to be of academic interest only. However, the danger of development of explosive



(Not Restricted)

and noxious gases in sealed spaces freshly painted or in which oils have been stored is real. Such spaces should be thoroughly ventilated and tested for carbon-monoxide and other explosive gases before personnel are permitted to enter. The personnel entering should have safety lines attached as prescribed in BuShips Manual.

PAINTING: Navy paint has a very high content of lead. When applied as a spray, approved respirators should be worn by the operators to prevent lead poisoning.

SURFACE PREPARATION: Chipping and scaling of ships and the use of mechanically driven brushes and grinders present great danger of damage to eyes by flying fragments of material dislodged in the process. Approved goggles should be worn by all personnel performing this work.

WATER: Harbor water always must be considered to be contaminated. Except in emergencies, ships anchored in harbors should not be permitted to make fresh water. (Reference BuEng Circular Letter #34 of January 24, 1935 and Article 1324, U. S. Navy Regulations 1920). Water delivered by barge to ships in harbors is subject to contamination by handling. For these reasons fresh water made by ships in harbors or delivered to them in barges should be chlorinated and tested at frequent intervals for contamination. The personnel of such ships should be given typhoid booster inoculations unless previously inoculated within a period of 90 days. CNO 272040, 28 November 1945, states in part: "Within the above areas (harbors) only fresh water should be used for culinary work and for cleaning of all messing equipment including washing down of decks and bulkheads of any spaces where food is openly stored or prepared. Appropriate instructions will be posted in all commissary spaces."

FUMIGATION: Whenever it is considered necessary to use hydrocyanic acid gas as the fumigant, the expert advice and help of the U. S. Public Health Service should be obtained. The Commandants of all districts concerned have been requested to make arrangements for this service to the Fleet.

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(Not Restricted)

Training in Physical Medicine: Recent years have seen remarkable advances in Physical Medicine. In both military and civilian practice, treatment by physical agents and means has come to be recognized as one of the specialties of medicine. Experience in naval hospitals during the war has emphasized the value of Physical Therapy, Occupational Therapy, and prescribed

(Not Restricted)

exercise as a part of the therapeutic regime. Experience has equally emphasized the need for medical officers, thoroughly grounded in the fundamentals on which these forms of treatment are based, to prescribe and supervise a treatment routine to meet the needs of the individual patient.

In civil life, the Baruch Committee on Physical Medicine has provided funds for basic research and for teaching in Physical Medicine in selected medical schools and institutions. Fellowships have been established for physicians desiring to prepare themselves to practice this specialty, and medical schools have been assisted in developing courses in Physical Medicine as a standard feature of their curricula. In proposed plans for civilian rehabilitation centers, provisions for Physical Medicine are a major feature

In peacetime, Physical Medicine will continue to hold the important place in naval hospital practice that it attained during the war years, and the Physical Medicine Service will be included as one of the clinical services of the hospitals. At the present time, there is need for additional medical officers of the Regular Navy trained in Physical Medicine to head these services in this rapidly developing specialty. Instruction in Physical Medicine is, therefore, included in the expanding training program for medical officers.

Plans are being formulated for a course which will include an intensive review of functional anatomy as it applies to Physical Medicine, the physiology of exercise, medical physics, the clinical applications of Physical Therapy, Occupational Therapy, prescribed exercise, and the principles of rehabilitation. The principles and practice of artificial fever therapy will also be included. Upon completion of training, the medical officer can anticipate assignment to a naval hospital for duty in his specialty.

Medical officers are requested to give careful consideration to specializing in this field of medicine. In order to assist the Bureau with plans for training in Physical Medicine, medical officers who desire such training are invited to express their interest by letter to the Bureau of Medicine and Surgery, attention, Professional Division.

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(Not Restricted)

Public Health Foreign Reports:

<u>Disease</u>	<u>Place</u>	<u>Date</u>	<u>Number of Cases</u>
Plague	British E. Africa, Uganda	Jan. 5-12, '46	5 fatal
	Egypt, Alexandria	Jan. 12-19, '46	1 confirmed
	Madagascar	Dec. 1-20, '45	23
	Peru	November '45	22 (4 fatal)
	Peru, Tumbes Dept.	December '45	13 (3 fatal)
Smallpox	Belgian Congo	Dec. 8-15, '45	88
	Morocco (French)	Dec. 21-31, '45	154
	Peru	November '45	45
	Sudan (French)	Dec. 1-31, '45	472
	Venezuela	December '45	54
Typhus Fever	Belgian Congo	Dec. 8-29, '45	307 (11 fatal)
	Chile	Nov. 3-30, '45	60 (8 fatal)
	Egypt	Dec. 1-15, '45	92
	Greece	Dec. 15-22, '45	19
	Morocco (French)	Dec. 21-31, '45	161
	Peru	November '45	96
	Rumania	Reported Jan. 8, '46	250 weekly
	Turkey	Dec. 29-Jan. 12, '46	82
Yellow Fever	Bolivia, Santa Cruz Dept.	Jan. 18, '46	39 fatalities suspected as due to yellow fever
	Colombia, Putumayo Commissary		
	Mocoa, Umbria	Nov. 23, '45	1 fatal
	Venezuela, Trujillo State	Jan. 5-12, '46	2 confirmed

(Pub. Health Foreign Reports - Feb. 1, 8 and 15, '46)

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(Not Restricted)

To: All Ships and Stations.

S33-6-(631-5805M)

Subj: Rat Infestation, Request for Information  
Concerning.

EN28/A2-11; FS/S36-3

C. L. 46-15

18 January 1946

Ref: (a) Sec. A-12, General Specifications for Building Vessels of U.S. Navy.

1. The presence of rats aboard ship is recognized as potentially hazardous to the health of personnel as well as destructive of Government property.

2. The most successful method for control of rats aboard ship is through observing certain basic principles of ratproofing during the construction of the vessel. To this end, the Bureau of Ships, by reference (a), has specified ratproofing measures to be observed by the design and construction agents of U. S. naval vessels.

3. In order to evaluate the success of these measures and to determine to what extent rat infestation on U. S. naval vessels may constitute a menace to health of personnel and to Government property, the commanding officer is requested to submit a report to the Bureau of Ships with copy to the Bureau of Medicine and Surgery incorporating answers to the following questions:

- (a) Has evidence of rat infestation been observed (rat tracks, gnawing, destruction or consumption of food, live rats)?
- (b) Spaces in which evidence of rat infestation has been observed.
- (c) Nature of rat harborages (ballast, bilges, double bulkheads, under gratings, among stores, in insulation).
- (d) Have traps been set (number of rats thus caught)?
- (e) Recent dates of fumigation for rats (number of rats thus recovered).
- (f) Is there any evidence that rats are nesting or have nested in fibrous glass insulation greater than 1" in thickness?

4. Commanding officers are not required to submit a reply to this letter if answers to all questions of paragraph 3 would be negative. Failure to receive a reply from any given vessel within 8 weeks of the date of this letter will be interpreted by the Bureau of Ships and the Bureau of Medicine and Surgery as equivalent to a report that no evidence of the presence of rats exists aboard that vessel.

--BuShips. C. L. Brand.

--BuMed. Ross T. McIntire.

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RESTRICTED

Circular Letter 46-39

(Not Restricted)  
BUMED-E-CLV  
A3-4/EN(073-40)  
14 February 1946

To: All Ships and Stations.

Subj: Inactive Medical Department Records of Vessels  
Placed in "Inactive Status" and Stations Placed in a  
"Caretakers Status".

Ref: (a) BuMed Cir Ltr No. 46-17, 18 Jan 1946 (N.D. Bull, Item 46-253).

1. The following change shall be made in ref (a), par. 1, subpar (a).

Insert between the words "the" and "letter":

-records to be transferred, and shall also have attached  
copies of the inventories of the various record containers.  
Carbon copies of the-

--BuMed. Ross T. McIntire.

\* \* \* \* \*

Circular Letter 46-40

(Not Restricted)  
BUMED-Y  
L8-2/JJ57  
15 Feb 1946

To: All Ships and Stations.

Subj: Penicillin Therapy of Early and Latent Syphilis,  
Discontinuance of Reporting on Forms NavMed 621, 622 and 623.

Ref: (a) BuMed Cir Ltr 45-36, 13 Feb 1945 (N. D. Bull., Item 45-148).  
(b) BuMed Cir Ltr 45-127, 18 May 1945 (N. D. Bull., Item 45-559).  
(c) Manual of the Medical Department 1945, Par 5127.

1. Subject reports are hereby discontinued. Ref (a) is canceled and ref (b) is modified accordingly.

2. The attending medical officer shall, however, continue to make the necessary monthly serological examinations for one year and a spinal fluid examination between the third and sixth months, following completion of treatment; and the results of these examinations shall be entered on form NavMed H-7.

3. The following deletions shall be made in the 1945 edition of the Manual of the Medical Department, ref (c).

DELETE - Par 5127, page 493

(Not Restricted)

DELETE - Entries concerning NavMed 621, 622 and 623 in table on page 473 and in index on page 571.

--BuMed. Ross T. McIntire.

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Circular Letter 46-47

To: All Ships and Stations.

Subj: Dental Burs, Requisitioning of.

Ref: (a) BuMed Cir Ltr 44-97, 30 May 1944.

1. Reference (a), directing that dental officers not requisition burs in excess of the bur allowance table, is hereby cancelled.

--BuMed. W. J. C. Agnew.

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ALNAV 77

Subj: Transfer of Narcotics, Alcohol, and Spirits.

All Ships transfer narcotics, medicinal alcohol, and spirits in excess of estimated requirements for 12 months normal operations to nearest medical supply facility on Form SandA 127.

--SecNav. James Forrestal.

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ALNAV 78

Subj: Health Records.

Check all health records now on board against muster roll and forward records of individuals not attached and whose present stations cannot be ascertained to the Bureau of Medicine and Surgery immediately.

--SecNav. James Forrestal.

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ALNAV 80

Subj: Casualty Reports.

(Not Restricted)

BuPers (532)

14 February 1946



(Not Restricted)

Since surrender of Japan some commands failing report personnel casualties compliance Alnav 120-45, particularly injury cases. Alnav 120-45 still in effect. Full compliance directed.

--SecNav. James Forrestal.

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Disestablishment of Naval Medical Activities. As published in the Navy Department Semimonthly Bulletin of 15 February 1946, the following Naval Medical activities were disestablished as of the dates shown:

<u>Name</u>	<u>Address</u>	<u>Date of disestablishment</u>
U. S. Naval Special Hospital	Arrowhead Springs, Calif.	7 February 1946

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#### U. S. NAVY V-12 MEDICAL UNITS

<u>Naval district</u>	<u>Location</u>	<u>Date of disestablishment</u>
First	Harvard Medical School	9 February 1946
Third	Columbia University	9 February 1946
Third	University of Rochester	16 February 1946
Fourth	Jefferson Medical College	2 February 1946
Fourth	Temple University	23 February 1946
Sixth	Medical College of South Carolina	2 February 1946
Eighth	University of Alabama	2 February 1946
Ninth	University of Kansas	7 February 1946
Ninth	University of Nebraska	9 February 1946
Ninth	University of Wisconsin	9 February 1946
Eleventh	College of Medical Evangelists	25 February 1946
Twelfth	University of California Medical School	23 February 1946

#### U. S. NAVY V-12 DENTAL UNITS

<u>Naval district</u>	<u>Location</u>	<u>Date of disestablishment</u>
First	Harvard Dental School	9 February 1946
Third	Columbia University	9 February 1946
Fourth	Temple University	2 February 1946
Fifth	University of Maryland	28 February 1946
Eighth	Texas University	16 February 1946
Ninth	Loyola University	2 February 1946
Ninth	Western Reserve University	6 February 1946
Ninth	University of Michigan	23 February 1946
Twelfth	University of California	23 February 1946